

ANOTHER COASTAL PLAIN RELICT IN THE  
MISSOURI OZARK REGION

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INTENSIVE exploration since 1936 of sink-hole ponds in the Missouri Ozarks has brought to light a startling number of plants whose main distribution is confined wholly or chiefly to the Atlantic or Gulf Coastal Plain or its counterpoart of the Mississippi Embayment extension. These ponds, located on top of the uplifted plateau-like Ozark peneplain, are scattered over the more level portions of the plateau, chiefly in the southeastern Ozark counties (See Mo. Bot. Gard. Bull. **39**: 131, 132, and map on pp. 128, 129. June, 1951). One of the species, *Scirpus etuberculatus*, which in Missouri is known only from a sink-hole pond in Oregon County, occurs elsewhere from Delaware near or along the coast to Florida and west to Louisiana. Other primarily Coastal Plain species, such as *Zizaniopsis miliacea*, *Eleocharis equisetoides*, *Scirpus Hallii*, *Echinodorus tenellus*, *Nyssa aquatica*, *Eryngium prostratum*, *Hottonia inflata*, and *Gratiola viscidula*, are isolated in and around some of these upland ponds. Some of them, such as *Eleocharis equisetoides*, *Scirpus Hallii*, *Echinodorus tenellus*, and *Gratiola viscidula*, have not been found in the Mississippi Embayment section of the lowlands of southeastern Missouri or elsewhere in the state, whereas others, such as *Zizaniopsis miliacea*, *Nyssa aquatica*, *Eryngium prostratum*, *Hottonia inflata*, *Hydrolea uniflora*, *Hedyotis Boscii*, *Cephalanthus occidentalis* var. *pubescens*, and *Pluchea foetida*, are otherwise known only from the Mississippi Embayment section of southeastern Missouri. Associated with the species of primarily southern and Coastal Plain affinities are others ranging farther northward, but in Missouri occurring only around the sink-hole ponds. Among these may be mentioned *Najas gracillima*, *Potamogeton pulcher*, *Potamogeton epihydrus* var. *Nuttallii*, *Glyceria acutiflora*, *Carex alata*, *Carex decomposita*, *Carex straminea* Willd. (not *C. straminea* sensu Mackenzie nor of Gray's Manual, 7th edition), and *Decodon verticillatus*.

Of particular phytogeographical significance, therefore, is the discovery of another typical Coastal Plain species from the vicinity of one of these sink-hole ponds. I refer here to *Eupa-*

*torium hyssopifolium* L., var. *calcaratum* Fern. & Schub., a collection of which I have carefully studied in comparison with other herbarium material. The range of typical *E. hyssopifolium* is given in the eighth edition of Gray's Manual as "Fla. to e. Tex., n. to s. R. I., L. I., N. J. and Md." and for var. *calcaratum* as "Dry open woods and clearings, on or near Coastal Plain, Ga. to Tex., n. to se. Mass., R. I., Ct., se. N. Y., N. J., Pa. and Md." My collections were made from dry open places bordering a sink-hole pond in southern Missouri. The surrounding upland has a more level and unbroken appearance than the more characteristic rugged and dissected topography usually associated with the Ozarks.

Like *Scirpus etuberculatus*, this interior Ozark station for *Eupatorium hyssopifolium* var. *calcaratum* is isolated by a thousand miles or more from its nearest Coastal Plain habitat. Species with which *Eupatorium hyssopifolium* var. *calcaratum* was associated are *Ilex decidua*, *Eryngium prostratum*, *Diodia virginiana*, and *Pluchea foetida*, whose distributions are mainly found in the Gulf and Atlantic Coastal Plain areas and the Mississippi Embayment section.

Specimens of the collection have been deposited in the Chicago Natural History Museum Herbarium, Gray Herbarium, and Missouri Botanical Garden Herbarium. The data for the collection of *Eupatorium hyssopifolium* var. *calcaratum* in Missouri is, dry open places bordering Twin Ponds, east of highway A, T 23 N, R 8 W, NW  $\frac{1}{4}$  sect. 16, in dry upland, 4 miles south of West Plains, Howell County, September 3, 1949, *Steyermark 69063*.

The occurrence of this isolated Coastal Plain plant in the dry interior of the Ozark highlands is comparable to the occurrence of some of the stranded Coastal Plain relicts found on the Cumberland Plateau and elsewhere in the eastern United States. Present studies based upon the author's explorations of numerous sink-hole ponds during the past decade and a half indicate that the Missouri sink-hole ponds represent the last remnants of parts of the swampy peneplain that formerly existed in the state prior to the last uplift of this peneplain area at the end of the Tertiary Period. The drainage of these ponds is connected with that of underground streams flowing eventually southeastward into the Mississippi River or Mississippi Embayment, or southward into

the White River drainage, the latter eventually connecting with the drainage of the Mississippi River. As the Tertiary uplift of the Ozark region gradually changed the peneplain from a region of sluggish streams and swampy habitats to the present upland topography with its rocky drier soils and dissected well-drained topography, the formerly more abundant aquatic and sub-aquatic habitats of the swampy peneplain became more drained and eventually were reduced to a relatively few localities centering around the present sink-hole ponds. After Pleistocene times the Xerothermic period must have further reduced the occurrence of strictly aquatic habitats, exterminating Coastal Plain and other species that had survived from the end of the Tertiary uplift.

These sink-hole ponds give every evidence of having served for aquatic habitats in the past and at present they afford a refuge in the Ozarks by being the last remaining habitats suitable for Coastal Plain and Mississippi Embayment species. Botanically, therefore, they represent probably the most significant relict habitat in the Ozarks, dating back to the close of the Tertiary Period, and the species isolated in their distribution to these ponds are in Missouri certainly to be considered as among the oldest, if not the oldest, elements in the flora of the state.—  
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## ADDITIONS AND EXTENSIONS TO THE FLORA OF NOVA SCOTIA

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THE following records of collections were made, chiefly during 1950–51, while collecting for the Nova Scotia Museum of Science. To avoid repetition, new records for Cape Breton were included in the recent paper by Dr. E. C. Smith (*RHODORA* 54: 220. 1952).

*LYCOPODIUM SELAGO* L. Amethyst Cove, King's County. First record for mainland.

*SPARGANIUM HYPERBOREUM* Laest. New Harbour, Guysborough County. First record for mainland.

*BROMUS TECTORUM* L. Common on railway ballast around the railway station at Berwick, King's County. Confirmed by W. G. Dore of the Dominion Experimental Farm, Ottawa who